

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

Waste Storage Pond

(Number)

Code 425

DEFINITION

This practice defines an impoundment made by excavation and/or earthfill for temporary storage of animal or other organic agricultural waste.

PURPOSES

The purpose of this practice is to develop a component of a waste management system to store liquid and solid waste, waste water, and polluted runoff to reduce pollution and to protect the environment.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where:

1. The pond is a necessary component of a system prepared according to the Natural Resources Conservation Service (NRCS) standard for Waste Management System (312);
2. Temporary storage is needed for organic wastes generated by agricultural production or processing;
3. The pond can be located without polluting air or water resources; and
4. Soils and topography are suitable for construction of the pond.

CRITERIA

Service Life. The structure shall be planned, designed and installed to provide a minimum service life of ten years.

Environmental Protection. Seepage from waste storage ponds shall be restricted to the extent necessary to prevent contamination of surface or subsurface waters, or collect, isolate and treat seepage prior to returning it to surface or subsurface waters.

Foundation. The pond, if possible, should be designed on soils of slow permeability. Avoid gravelly soils and shallow soils over fractured or cavernous rock. If in-situ slow permeability soils are not available, the pond shall be sealed by the placement of compacted, slowly permeable soils from offsite, bentonite, soil dispersant salts or impermeable membrane lines. Compacted soil linings shall be at least 2 feet thick measured vertically and placed in lifts of 6 inches. Each lift shall be compacted sufficiently with a sheepsfoot roller or other suitable compaction equipment to reduce permeability as much as possible. Bentonite, soil dispersant salts and impermeable membranes shall be designed and installed in accordance with Pond Sealing (521A, 521B or 521C.)

The low point of the pond shall be at least 2 feet above the normal seasonal high water table. A

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

soils investigation shall be conducted to a depth to design, to document the soils and the depth to water table for the pond location. This information should be shown in the plans. At sites where the water table is within at least 2 feet of the lowest point in the pit, the feasibility of lowering the water table with subsurface drainage should be considered. Any drainage installed must be sealed from the waste in the pond by the liner, whether it is compacted soil or a mechanical liner. If this is not possible, alternatives such as an impermeable liner or Waste Storage Structure (313) should be considered.

In slowly permeable soil, over-excavate the bottom of the pond a minimum of six inches and recompact with a sheepsfoot roller or other suitable equipment. Where there is concern about gravel layers, depth to bedrock or the presence of a high water table, over-excavate a minimum of one foot and recompact as above.

For waste storage ponds where agitation is planned, install anti-scour pads to prevent erosion of the foundation and embankment. Normally these will consist of concrete pads a minimum of 4 inches thick, without steel reinforcing, which extend in all directions a minimum distance of 10 feet outward and/or up the side slopes from each point where the agitator pump is operated. Consideration should be given to having more than one agitation point to thoroughly mix the waste to remove as many of the solids as possible.

Storage Period. The storage period is the maximum anticipated length of time between emptying, based on climate, crops, equipment and labor. Storage periods from 180 to 365 days should be considered so that the waste can be spread during the growing season for maximum utilization of the nutrients in the manure. For waste storage ponds requiring approval from IDEM, the minimum storage period is 120 days unless a manure management plan detailing a satisfactory storage and spreading schedule is developed.

Design Volume. The waste storage pond shall store the design volume. The design volume

of 2 feet below the lowest point in the pond prior shall consist of the accumulated waste, bedding, wash water, dilution water, runoff and average annual precipitation. It is the total of the following:

1. Manure waste water and contaminated runoff for the storage period;
2. Normal precipitation less evaporation on the pond;
3. 25-year 24 hour rainfall on the pond;
4. 25-year 24 hour runoff from the drainage area¹;
5. Freeboard².

¹ For ponds with a contributing drainage area

² One foot in addition to all other storage volumes

Permanent staff gauges to show the design full and half-full elevations should be installed. Design full is the design volume minus the 25-year runoff, direct 25-year precipitation and freeboard.

Inlet and Outlet. Inlets to storage ponds can be of any permanent type designed to resist erosion, plugging, and damage from ice. If slurry and solid waste is stored, the inlet should be designed to deposit the waste near the center of the pond beyond the toe of the side slope. The storage pond shall have no outlets that can automatically release effluent from the pond.

Pipe used to transfer manure shall meet or exceed the applicable specification listed in Table 1. Pipe used with manure pumps shall be in accordance with the pump manufacturer's recommendations. All joints in the pipe shall be watertight.

Table 1. Pipe Specifications

<u>Pipe Material</u>	<u>Applicable Specification</u>
Plastic (PVC)	ASTM: D3034; D1785; D2241; F679; F794

Plastic (HDPE)	AASHTO: M294 Type S
Concrete	ASTM: C76
Steel	ASTM: A52; A134; A135; A139

Valves should be installed on pipes where there is a positive working head against the pipe that might cause the release of effluent. As a minimum, two valves should be installed. One should be located near the entrance of the pipe into the pond and one at the pumping facility.

Cleanouts shall be installed in pipes of 18 inches or less. The cleanouts shall be spaced at a maximum 100 feet centers.

Swine Manure. Pipe used to transfer swine manure by gravity, shall be at least 6 inches in diameter. For continuous flow systems the grade shall be between 0.5% and 1.0%. Flush type systems that accumulate waste in a hopper or temporary storage at the head of the system can be designed with steeper grades, though they should not exceed 5.0%.

The pipe should enter the pond at least 3 feet above the pond bottom elevation. For pipes entering below the design volume elevation, a cleanout should be installed.

Dairy Manure. Pipe used for the gravity transfer of dairy manure shall be a minimum of 24 inches in diameter with a maximum of 36 inches. The system shall have a minimum head of 5 feet from the full level in the inlet hopper to the design full level in the pond. The grade of the pipe shall not exceed 5.0% and the length 200 feet. The pipe should enter the pond at the bottom elevation.

Earth Embankment. The embankment shall be constructed of compacted earthfill. A cutoff of slowly permeable earthfill shall be provided at, or just upstream of the embankment centerline. The cutoff should be deep enough to intercept shallow, pervious foundation strata, have a bottom width adequate to accommodate construction equipment and have side slopes not steeper than 1.5:1. The minimum depth of the cutoff shall be 2 feet after topsoil stripping has been completed.

The design height of the embankment shall be increased by the amount needed to insure that the design top elevation will be maintained after settlement. This increase shall not be less than

5%. The minimum top width shall be 8 feet. The combined side slopes of the settled embankment shall not be less than 5 horizontal to 1 vertical and no slopes shall be steeper than 2.5 horizontal to 1 vertical.

Excavation. Most ponds consist of a balance of excavation and fill. If soils of questionable permeability are encountered during excavation, they should be removed and the area sealed with a layer of compacted slowly permeable soil. If extensive compaction is expected on the inside slopes of the pond, they should be flattened to 3 horizontal to 1 vertical for ease of compaction.

Erosion and Sediment Control and

Revegetation. Caution should be taken to prevent sediment from leaving the work area during construction. Erosion and sediment control measures should be shown on the construction plans. Embankments and other disturbed areas should be seeded and mulched immediately after construction, according to Critical Area Planting Specification 342.

Disposal Facilities. Waste shall be removed from the storage and used at locations, times, rates and volumes without polluting the surface or ground water as shown in the Nutrient Management Plan (590). Depending upon the type and consistency of the waste, the proper equipment must be available to remove and apply it to the land at the appropriate time and place.

Removal of solids from the pond can be improved with adequate agitation of the waste before pumping begins. Agitation is affected by the shape of the pond. A square or circular pond will agitate more easily than a long narrow pond. Sloping of the bottom in one direction with a sump in one corner will improve pumping efficiency. The sump should be at least one foot lower than the bottom of the pond.

If solids accumulation is anticipated to be a problem, an access ramp should be designed for the pond. The ramp should be no steeper than 8 horizontal to 1 vertical and at least 12 feet wide.

Safety. Warning signs, ladders, guard rails, fences and other devices shall be provided to insure the safety of humans and livestock. Fencing shall be in accordance with Fence (382.) Signs, ladders, guardrails and other safety devices shall comply with OSHA Part 1910.

CONSIDERATIONS

Federal, State and Local Laws. The waste storage pond shall be designed in accordance with all applicable federal, state and local laws. Approval from the Indiana Department of Environmental Management (IDEM) is required for all confined animal feeding operations which exceed 300 cattle, 600 swine or sheep or 30,000 poultry, or those operations, which regardless of size, violate the Stream Pollution Control Law or other IDEM regulations.

Location. Waste storage ponds should be located as close to the source of the waste and polluted runoff as practicable. IDEM requires separation distances that must be adhered to.

REQUIRED IDEM SEPARATION DISTANCES

Public Road*	50 ft.
Water Well	100 ft.
Stream, Drainage	
Ditch or Body of Water*	100 ft.
* Unless secondary containment is provided and approved by IDEM	

Due consideration should be given to economics, access to other farm facilities, methods of loading and unloading wastes and health and safety regulations. The ponds should be located where prevailing winds, vegetative screening and building arrangement minimize odor and visual resource problems. Nonpolluted runoff should be excluded and routed away from the pond. Waste storage ponds shall not be located on flood plains unless they are protected from inundation or damage from the 25-year flood event.

Utilization/Disposal Facilities. The operator shall have the means to remove waste from the storage pond, to process it for energy or apply it to the land at the locations, times and rates shown in the Nutrient Management Plan (590). The waste should be thoroughly agitated when emptying to limit the buildup of solids. The

design shall contain provisions to remove accumulated solids from the bottom of the pond.

PLANS AND SPECIFICATIONS

Plans and specifications for waste storage ponds shall be in keeping with this standard and applicable federal, state and local codes. The plans must show all features required for the proper installation and functioning of the practice, including but not limited to: plan view; cross sections; drainage details; pipe profiles; erosion and sediment control; access; and safety features.

Documentation. A waste storage pond shall not be reported as complete until adequate documentation, showing the proper installation is complete. The as-built drawings shall be signed and dated by the person with construction approval authority for the practice to indicate that the pond was constructed as designed, except for any red lined changes shown on the plans. In addition, the as-built drawings shall include the actual foundation and ground water conditions encountered during construction, the name of the contractor and date of completion. The design folder with the as-built plans and specifications shall be filed with the Waste Management System plan in the conservation plan folder.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be prepared for the owner/operator which describes the things one must do to operate and maintain the waste storage pond for its design life. As a minimum, the plan must describe the actions necessary to maintain the structural integrity of the embankment, pipes and other elements of the pond and to operate it in a safe and environmentally sound manner. The plan should also detail emergency procedures that should be followed in case of an effluent spill or accident causing personal injury.